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(54) Slicing machine carriage driving means

(57) A food slicer with a choice of product table operating modes incorporating a controller and a number of sensors. Operating modes include manual, servo-assisted and powered according to either predefined, or user defined parameters. There is also a learning mode in which the operator can arrange for the food slicer to store parameters from manual table movements for use in powered mode.

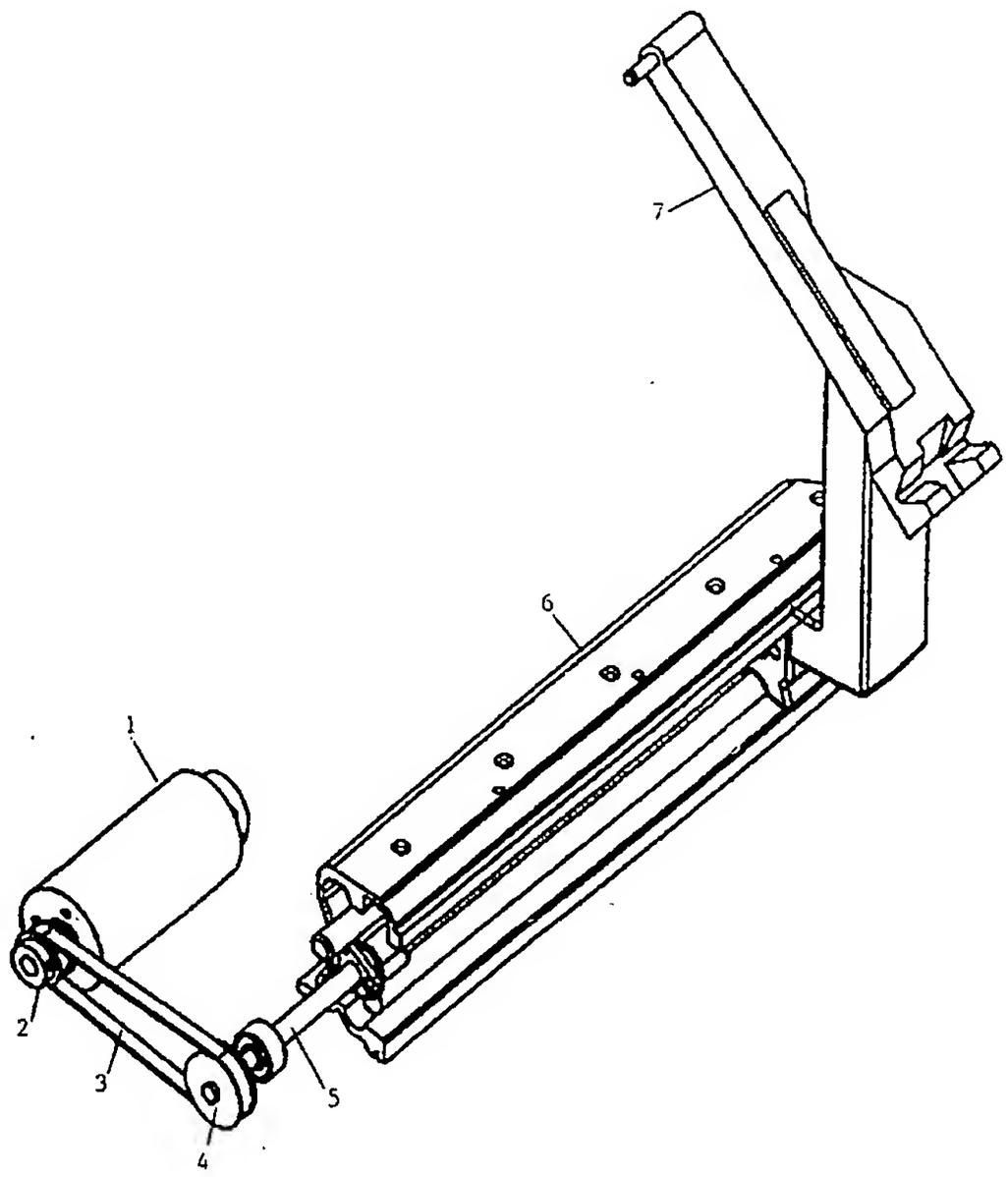

Figure 1

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Description

The invention relates to food slicer machines affording programmable control of movement of the product table. On food slicer machines, the product is held on a table which is moved across a fixed position rotating blade. Originally such food slicer machines were manually operated, however later models introduced power-driven tables for easier operation. However such tables have a number of drawbacks. In particular, the existing powered table slicing machines are inflexible regarding selection of speed and length of table movement and selection of operating mode.

The present invention discloses a food product slicer comprising a blade and a moveable product table for moving the product across the blade, the slicer being arranged to allow manual and powered operation of the table wherein powered movement of the table is programmable.

The food product slicer preferably is able to detect manual movement of the table and repeat such movement under programme control.

The food product slicer will preferably apply force to the table to assist the operator in moving said table.

The present invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows a perspective view of the table drive mechanism.

Figure 2 shows an exploded perspective view of part of the table drive mechanism.

According to this embodiment the food slicer includes a motor 1 with an encoder device (not shown) connected to the motor or elsewhere. The motor 1 drives a power lead screw 5 inside frame 6 typically via a toothed belt and pulley system 2, 3, 4. A lead screw nut 8, Figure 2, is fixed to the carriage 7 of the table (not shown) to allow it to be moved by means of the lead screw. The lead screw nut 8 is arranged to be engaged/disengaged from the carriage 7 to allow manual or powered operation. The motor 1 is controlled by a controller (typically a processor - not shown). The controller receives inputs from the following sensors. The encoder, mentioned above, identifies the position of the carriage 7. A sensor, e.g. current switch (not shown), in the power supply circuit to the motor 1 senses excess load conditions which may result from the drive system encountering an obstacle or an end-stop. A direction sensor, e. g. a force transducer (not shown) positioned between the table and slicer base (not shown), senses the direction of manual action on the table i.e. the operator moving or applying a force to move the table sends a signal to the controller to drive the table in that direction.

The selection of manual mode, servo-assist mode, predefined mode or user defined mode is made via a suitable input device such as a keyboard (not shown) which instructs the controller. On selecting manual mode, the device seeks the home position and disengages the table carriage from the drive, allowing the table to be freely moved across the fixed rotating blade by the operator. On selecting servo-assist mode, the motor drives the table according to the signal from the direction sensor. Thus the operator can exercise manual control of the table either in manual mode or servo assist mode. In automated learn mode the table is first moved to any wanted start position by the operator, learn mode is selected, the table is then moved to the desired finish position by the operator at the speed required. The positions and speed are detected and committed to memory by the controller. The memory can be recalled. Alternatively the operator may define speed and stroke length, or recall predefined values covering such parameters as start and finish positions, stroke length and speed from the keyboard.

The above embodiment is described by way of example only. Various modifications may be applied without departing from the scope of the invention. Other types of movement detection may be used apart from the encoder device, the encoder device itself need not be connected to the motor but may be on the drive shaft or a linear encoder attached to the table itself. Other parameters, such as number of strokes, may be defined by the operator in a similar way.

Claims

1. A food product slicer comprising a blade and a moveable product table for moving the product across the blade, the slicer being arranged to allow manual and powered operation of the table wherein powered movement of the table is programmable.

2. A food product slicer of Claim 1 arranged to programmably repeat table movements generated under manual control.

3. A food product slicer of Claim 2 arranged to detect and record parameters of table movements under manual control.

4. A food product slicer of any above claim arranged to detect manual action with respect to the table and to apply a force to the table, said force being applied in a sense to assist said action, so providing a servo-assist mode.

5. A food product slicer of Claim 4 arranged to programmably repeat table movements generated in servo-assist mode.

6. A food product slicer of Claim 5 arranged to detect and record parameters of table movements in servo-assist mode.

7. A food product slicer of Claim 3 or Claim 6 arranged

to use said recorded parameters to programme movement of the table.

8. A food product slicer of any above claim arranged to programmably control table movements according to preset parameters.

9. A food product slicer of any above claim arranged to operate in several different modes wherein the mode of operation is selectable by the operator.

10. A food product slicer of any above claim comprising means for detecting the extent of movement of the table.

11. A food product slicer of any above claim comprising means for detecting the direction of movement of the table.

12. A food product slicer of any above claim comprising means for detecting excessive load conditions.

13. A food product slicer of any of Claims 10 to 12 comprising control means for receiving inputs from said detecting means and for controlling powered operation of the table according to the mode selected by the operator.

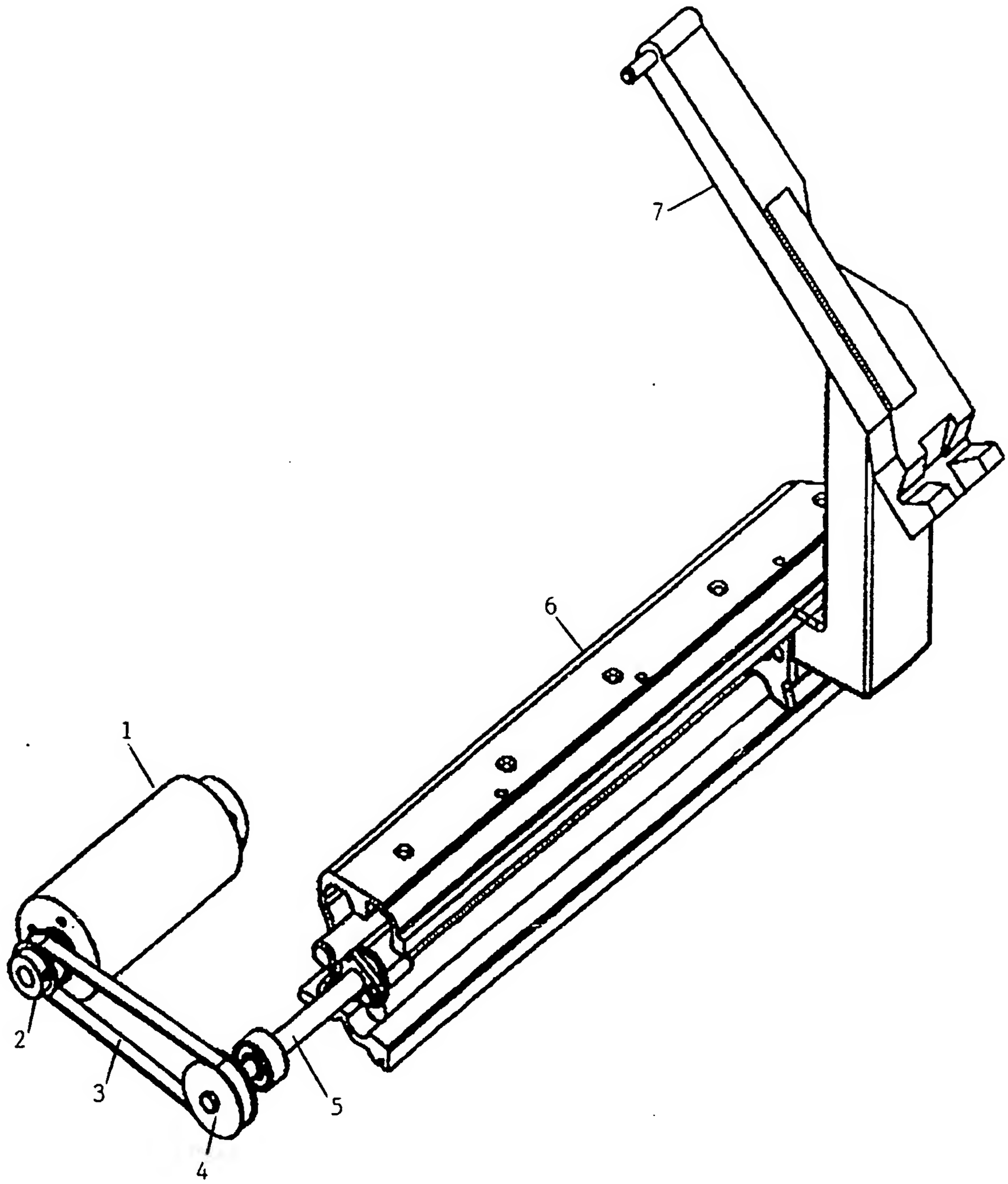

Figure 1

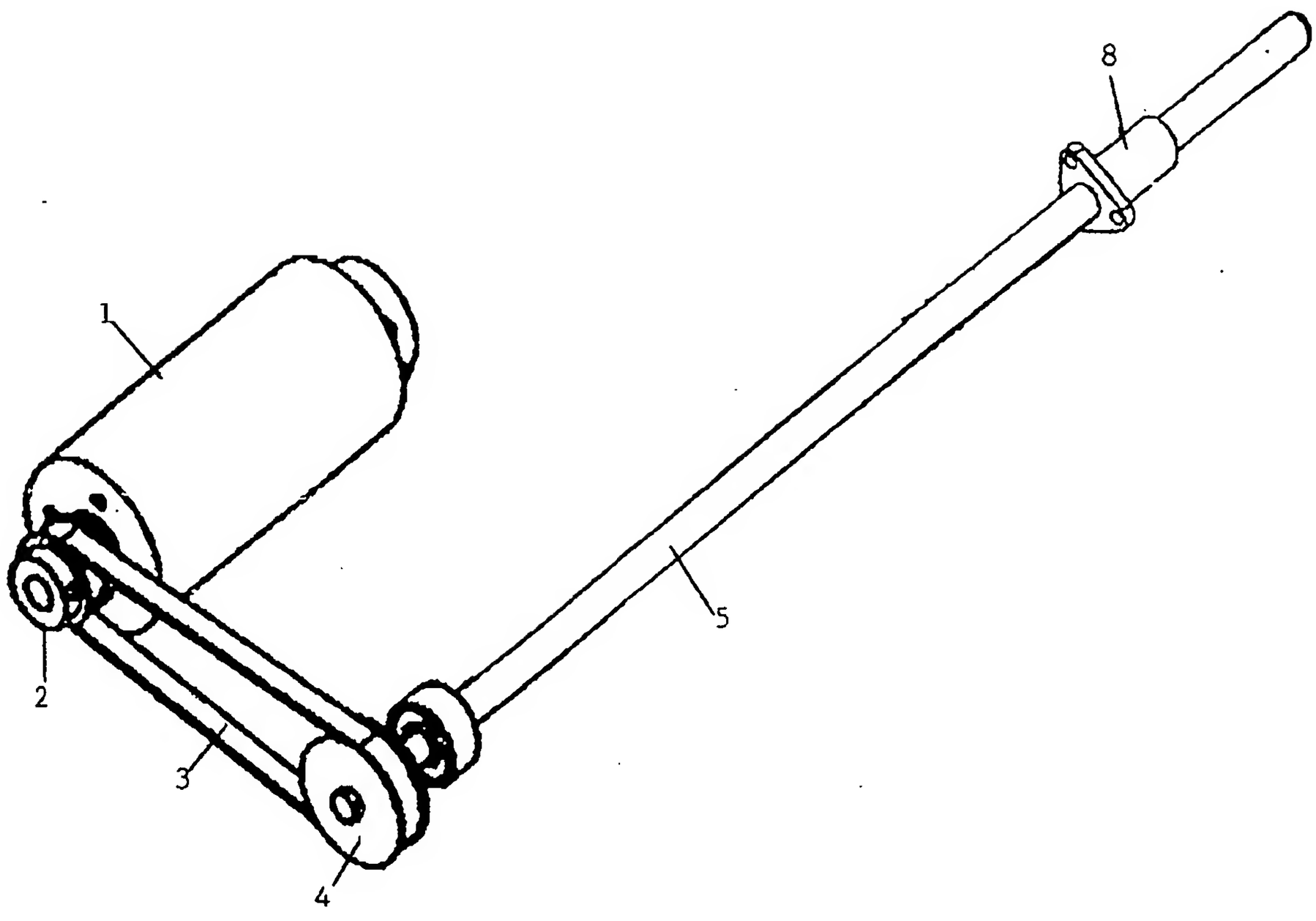

Figure 2